

1 1. A polynucleotide selected from the group consisting of:

2 (a) a polynucleotide comprising the nucleotide sequence set forth in SEQ ID NO: 1;

3 (b) a polynucleotide encoding a polypeptide comprising the amino acid sequence set

4 forth in SEQ ID NO: 2;

5 (c) a polynucleotide hybridizing to a DNA comprising the nucleotide sequence set

6 forth in SEQ ID NO: 1 under a stringent condition, wherein said polynucleotide encodes a

7 polypeptide having the activity of a D-aminoacylase having the physicochemical properties

8 of (i) and (ii) below; and

9 (d) a polynucleotide encoding a polypeptide having the amino acid sequence set forth

10 in SEQ ID NO: 2 in which one or more amino acid are substituted, deleted, inserted, and/or

11 added, wherein said polynucleotide encodes a polypeptide having the activity of a D-

12 aminoacylase having the physicochemical properties of (i) and (ii) below

13 (i) action: the enzyme acts on N-acetyl-D-amino acids to produce the

14 corresponding D-amino acids and

15 (ii) substrate specificity: the enzyme acts on N-acetyl-D-tryptophan, N-acetyl-D-

16 phenylalanine, N-acetyl-D-valine, N-acetyl-D-leucine, and N-acetyl-D-methionine, but not

17 on N-acetyl-L-tryptophan, N-acetyl-L-phenylalanine, N-acetyl-L-valine, N-acetyl-L-leucine,

18 or N-acetyl-L-methionine.

1 2. A polypeptide encoded by the polynucleotide of claim 1.

1 3. A vector comprising the polynucleotide of claim 1.

1 4. A transformed host cell comprising the polynucleotide of claim 1.

1 5. The transformed host cell of claim 4, wherein said cell is derived from *E. coli*.

1 6. A method of producing a polypeptide, said method comprising culturing the

2 transformed host cell of claim 4 in a culture, expressing the polypeptide in the cell, and

3 recovering the polypeptide from the culture.

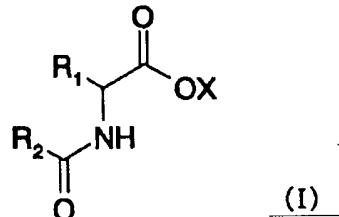
1 7. The method of claim 6, wherein said cell is derived from *E. coli*.

1 8. A polynucleotide hybridizing to the polynucleotide set forth in SEQ ID NO: 1 or the
2 complement thereof, wherein said polynucleotide comprises at least 15 nucleotides.

1 9. A method for synthesizing a polynucleotide, said method comprising chemically
2 synthesizing the polynucleotide of claim 8.

1 10. A method for detecting a polynucleotide, said method comprising hybridizing the
2 polynucleotide of claim 8 to a test polynucleotide, and determining whether hybridization has
3 occurred.

1 11. A method for producing D-amino acids, said method comprising contacting a
2 polypeptide with N-acyl-DL-amino acid represented by the formula (I) or its salt:



3
4 wherein R₁ and R₂ may be identical or different and each represents a hydrogen atom or a
5 substituted or unsubstituted hydrocarbon group; R₂ does not represent a hydrogen atom; and
6 X is H, NH₄, or a metal ion.

1 12. The method of claim 11, wherein R₁ and R₂ in the formula (I) each represents an
2 alkyl, alkenyl, alkynyl, cycloalkyl, aryl, or aralkyl group, or the derivative thereof.

1 13. The method of claim 12, wherein R₁ is a β-methylindolyl, benzyl, thiomethylethyl,
2 isopropyl, or 2-methyl-propyl group; and R₂ is a methyl, chloromethyl, phenyl, or
3 aminomethyl group.